

Department of Commerce § National Oceanic & Atmospheric Administration § National Weather Service

***NATIONAL WEATHER SERVICE INSTRUCTION 10-1101
OCTOBER 11, 2005***

Operations and Services

Space Weather Service Program, NWSPD 10-11

SPACE WEATHER PRODUCTS

NOTICE: This publication is available at: <http://www.nws.noaa.gov/directives/>.

OPR: W/OS23 (B. McNulty)

Certified by: W/OS2 (L. Spayd)

Type of Issuance: Initial

SUMMARY OF REVISIONS: None. This is the initial issuance.

//SIGNED//

September 27, 2005

Dennis H. McCarthy

Date

Director, Office of Climate, Water, and Weather Services

<u>Table of Contents</u>	<u>Page</u>
1. General.....	2
2. Background.....	2
3. Event-Driven Products.....	2
4. Regularly Scheduled Products.....	3
5. Space Weather Models.....	4
6. Space Weather Impacts.....	5
Appendices	
A. Space Weather Product Data.....	7

1. **General.** This instruction describes the space weather products provided by the Space Environment Center (SEC) in Boulder, Colorado.

2. **Background.** The SEC’s space weather operations center, located in Boulder CO, is a joint operation with the United States Air Force (USAF). They provide a wide array of space weather products in three categories: Event-Driven Products, Regularly Scheduled Products, and Space Weather Models. Additionally, the last section of this directive depicts impacts space weather activity can have on certain operations.

3. **Event-Driven Products.** Watches, Warnings, and Alerts are the primary event-driven products issued by SEC. They can be issued any time when conditions meet, or activity is expected to cross, specified thresholds.
 - a. Watch: Issued when conditions are favorable for the geomagnetic A-index to be above specific thresholds – for up to three days in advance of expected activity.

 - b. Warning: Issued when exceeding thresholds for energetic protons or geomagnetic activity is considered to be imminent. The messages contain the warning’s valid period and the expected maximum level of activity. A high level of confidence is required before a warning is issued.

 - c. Alert: Issued when an event threshold is crossed; contains information available at the time of issue. Alerts are issued for solar x-ray, radio, proton, and geomagnetic activity.

 - d. Summary: Issued after a solar x-ray, radio, or proton event ends; specifies the beginning, peak, and end of event times, along with the peak value of flux observed. Summary messages are also issued when geomagnetic activity ends subsequent to a sudden impulse.

Space weather notification messages are issued for these categories:

Category	Watch	Warning	Alert	Summary
Geomagnetic A-index	◆			
X-Ray Flux			◆	◆
Radio Bursts			◆	◆
Geomagnetic Sudden Impulse		◆		◆
Geomagnetic K-index		◆	◆	
Electron Flux			◆	
Proton 10 MeV and 100 MeV		◆	◆	◆

These alerts are available at <http://www.sec.noaa.gov/alerts/index.html>. Examples of some of these products can be found in Appendix A.

4. Regularly Scheduled Products. SEC’s regularly scheduled products are issued at specified intervals.

a. Report and Forecast of Solar and Geophysical Activity (RSGA): A joint product of NOAA and the USAF issued daily at 2200 Universal Time Coordinated (UTC) and is the primary daily report prepared by SEC forecasters. It provides a summary and analysis of solar and geophysical activity during the previous 24 hours as well as the most recent solar indices. It also provides a forecast of solar and geomagnetic activity and indices for the following three (3) days.

b. Preliminary Report and Forecast of Solar Geophysical Data (commonly known as the Weekly): Compiled every Tuesday and made available on SEC’s website each Wednesday. It is a technical publication intended for rapid distribution, especially useful to real-time operations and research organizations, and based on data available at publication time. Therefore, it cannot be cited reliably for reference purposes. It contains space weather highlights from the previous week and an outlook for the following 27 days, including tables and plots of solar and geophysical indices, data, activity and reports of special events and missing data not included previously.

c. GEOALERT: A coded message issued daily at 0330 UTC, and contains a summary of sunspot characteristics, energetic solar-geophysical activity, and selected solar-geophysical indices for the previous day. It also contains a brief encoded forecast of solar-geophysical activity that may affect people and systems. This product is issued by SEC in its capacity as the International Space Environment Service (ISES) World Warning Agency for the space environment.

d. Solar and Geophysical Activity Summary (SGAS): A joint product of NOAA and the USAF issued daily at 0245 UTC. It is a brief list of solar and geophysical events and indices for the previous UTC day, including energetic solar flares, proton events, geomagnetic activity, and stratospheric warming alerts that may affect people and systems.

e. The Solar Cycle 23 prediction charts and tables: Used to track solar cycle progression, are updated monthly by the SEC using the latest International Space Environment

Service (ISES) predictions.

f. SEC's Space Weather Now World Wide Web page gives the non-technical user a 'plain language' look at space weather, providing customers with notification of expected or observed space weather conditions. The page refreshes every 5 minutes and is located at <http://sec.noaa.gov/SWN/index.html>.

g. The Solar Region Summary (SRS), a joint product of NOAA and the USAF issued daily at 0030 UTC, providing a detailed description of active regions currently visible on the solar disk. Active solar regions are sources of potential x-ray flares that may affect people and systems.

Additionally, special advisories, which are designed to inform the general public and media of special circumstances and to increase awareness of the potential effects of space weather, are issued as necessary. Examples of some of these products can be found in Appendix A.

5. Space Weather Models. Space weather models cover a range of areas designed to stabilize predictions of solar activity which impacts our daily lives. The following is a list of current models, each with a brief description:

a. Costello Geomagnetic Activity Index: A neural network algorithm trained on the response of the Kp geomagnetic activity index to solar wind parameters. The model takes the most recent two hours of solar wind data and returns a 3-hour activity index prediction in units of Kp. SEC operations staff use the model output as an aid in issuing warnings for alert level geomagnetic disturbances. The graphic output for this model is displayed in two versions: a 1-day and a 7-day. An output list is also available. A brief description follows:

- (1) 1-day: Shows the latest output from the past 24 hours in two panels. The top panel plots the magnitude of the predicted index in Kp units and the 3-hour interval over which the prediction is valid. Error bars are plotted on the most recent prediction to show the 50% confidence interval. There is also an over plot of the most recent observed estimates of the Kp index, determined by the USAF methods. The plot automatically updates after each model run (every 15 minutes).
- (2) 7-day: Similar to the 1-day plot, but shows the most recent seven (7) days of model output. Additionally, simple statistics are calculated to characterize the model's performance on accuracy (rms error), bias (mean error), association (correlation), and skill or prediction efficiency (relative error). This plot and the statistics are updated after each model run (every 15 minutes).
- (3) Output List: A tabulated listing of model output which includes model run time, prediction valid time, prediction magnitude in Kp units, prediction lead time (L1 propagation time), and observed Kp index estimate.

b. D Region Absorption Model: Addresses the operational impact of x-ray flux on HF radio communication. The model can be viewed in near-real time on the SEC's web site. Primary customers of this SEC product are concerned with communication system outages or degradation. The model consists of four dynamic components: a global frequency map, an attenuation bar graph, status messages, and an estimated recovery clock. All of the components update continuously, driven by one-minute GOES X-ray flux data. To complement the global frequency map, zoomed-in views and a text version are also available.

c. Magnetospheric Specification Model (MSM): Computes fluxes of energetic electrons and ions in real-time, based on the Costello Predicted Kp. The MSM predictions are computed every fifteen minutes based on real-time solar wind measurements. The time of the predicted magnetospheric particle fluxes corresponds to the end-time of the most recent Kp prediction, taking into account the transit time of the input solar wind data from their measurement location to Earth. Satellite data is not available to verify quantitatively the model output prior to issuance. Because this model is being run with limited inputs, which are themselves the predictions of another model, caution should be exercised when using the model output to infer particle flux levels at specific times and locations within the magnetosphere.

d. Wang-Sheeley Model: Predicts background solar wind speed and interplanetary magnetic field (IMF) polarity at earth, two important parameters required for predicting geomagnetic activity. Advanced solar wind speed 1-day to 7-day plots and IMF polarity predictions are created using daily updated synoptic maps from Wilcox (WSO), Mount Wilson (MWO), and National/Kitt Peak (NSO) Solar Observatories. Typically, 3-day and 4-day advanced predictions provide the best overall agreement with the observations, because the mean propagation time from the source surface to earth is about 3 to 4 days.

e. Empirical Storm-time Ionospheric Correction Model (STORM): STORM provides an estimate of expected ionospheric change during periods of increased geomagnetic activity. The model estimates the departure from the norm of the F-region critical frequency (foF2) every hour of the day for the current and previous day. During a geomagnetic storm the F-region ionosphere can be either depleted or enhanced. When the ionosphere is enhanced, higher communication frequencies can be used, enabling a reduction in absorption and an increase in received signal strength. If the ionosphere is depleted, the maximum usable communication frequencies must be reduced to ensure reflection of the radio signal by the ionosphere to the receiver.

6. **Space Weather Impacts.** The most significant impacts to humans are noted in the following table:

Category	Effects
X-Ray Flux	<p>HF Radio: HF (high frequency) radio blackouts are possible on the entire sunlit side of the Earth. This results in degraded HF radio contact with mariners and en route aviators in this sector.</p> <p>Navigation: Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth, causing loss in positioning. Increased satellite navigation errors in positioning are possible on the sunlit side of Earth, which may spread into the night side.</p>
Radio Bursts	<p>Mobile communications: may disrupt cellular phone communications</p>
Energetic Electrons	<p>Spacecraft operations: may experience surface charging that can cause temporary or permanent damage to spacecraft systems.</p>
Energetic Protons	<p>Biological: elevated radiation hazards are possible to astronauts on EVA (extra-vehicular activity) and passengers and crew in high-flying aircraft at high latitudes.</p> <p>Satellite operations: satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage or reduction in efficiency to solar panels possible.</p> <p>Other systems: blackout of HF (high frequency) communications possible through the polar regions, and electronic navigation may be prone to errors.</p>

Appendix A – Space Weather Product Data

This appendix contains Space Weather product examples and descriptions. The most current issue/version of each product in this appendix can be found at <http://www.sec.noaa.gov/ftpmenu/latest.html>.

1. Space Weather Product Examples.

a. **Geomagnetic A-index**

- (1) Space Weather Message Code: WATA20
Serial Number: 414
Issue Time: 2005 Jul 13 2118 UTC

WATCH: Geomagnetic A-index of 20 or greater predicted
Valid for UTC Day: 2005 Jul 16

b. **X-ray Flux**

- (1) Space Weather Message Code: ALTXMF
Serial Number: 110
Issue Time: 2005 Jul 13 1445 UTC

ALERT: X-Ray Flux exceeded M5
Threshold Reached: 2005 Jul 13 1444 UTC
NOAA Scale: R2 - Moderate

- (2) Space Weather Message Code: SUMX01
Serial Number: 50
Issue Time: 2005 Jul 14 1147 UTC

SUMMARY: X-ray Event exceeded X1
Begin Time: 2005 Jul 14 1016 UTC
Maximum Time: 2005 Jul 14 1055 UTC
End Time: 2005 Jul 14 1129 UTC
X-ray Class: X1.2
NOAA Scale: R3 - Strong
Comment: The X-ray event occurred in Region 786 on the NW limb. No optical observation with this flare.

c. **Radio Bursts**

- (1) Space Weather Message Code: ALTTP2
Serial Number: 654
Issue Time: 2005 Aug 02 1859 UTC

ALERT: Type II Radio Emission
Begin Time: 2005 Aug 02 1824 UTC
Estimated Velocity: 2528 km/s

- (2) Space Weather Message Code: SUM10R
Serial Number: 418
Issue Time: 2005 Aug 02 1302 UTC

SUMMARY: 10cm Radio Burst
Begin Time: 2005 Aug 02 1240 UTC
Maximum Time: 2005 Aug 02 1242 UTC
End Time: 2005 Aug 02 1244 UTC
Duration: 4 minutes
Peak Flux: 240 sfu
Latest Penticton Noon Flux: 111 sfu

c. Geomagnetic Sudden Impulse

- (1) Space Weather Message Code: WARSUD
Serial Number: 53
Issue Time: 2005 Aug 01 0626 UTC

WARNING: Geomagnetic Sudden Impulse expected
Valid From: 2005 Aug 01 0627 UTC
Valid To: 2005 Aug 01 0800 UTC
IP Shock Passage Observed: 2005 Aug 01 0607 UTC

- (2) Space Weather Message Code: SUMSUD
Serial Number: 72
Issue Time: 2005 Aug 01 0647 UTC

SUMMARY: Geomagnetic Sudden Impulse
Observed: 2005 Aug 01 0641 UTC
Deviation: 18 nT
Station: Boulder

d. Geomagnetic K-index

- (1) Space Weather Message Code: WARK04
Serial Number: 1136
Issue Time: 2005 Aug 01 0138 UTC

WARNING: Geomagnetic K-index of 4 expected
Valid From: 2005 Aug 01 0139 UTC

Valid To: 2005 Aug 01 1500 UTC
Warning Condition: Onset

- (2) Space Weather Message Code: ALTK04
Serial Number: 1077
Issue Time: 2005 Aug 01 0143 UTC

ALERT: Geomagnetic K-index of 4
Threshold Reached: 2005 Aug 01 0141 UTC
Synoptic Period: 0000-0300 UTC
Station: Boulder
Active Warning: Yes

e. Electron Flux

- (1) Space Weather Message Code: ALTEF3
Serial Number: 988
Issue Time: 2005 Jul 26 1045 UTC

ALERT: Electron 2MeV Integral Flux exceeded 1000pfu
Threshold Reached: 2005 Jul 26 1005 UTC
Station: GOES12
Observed Yesterday: Yes
Yesterday Maximum 2MeV Flux: 4800 pfu

f. Proton Flux

- (1) Space Weather Message Code: WARPX1
Serial Number: 267
Issue Time: 2005 Jul 28 2243 UTC

EXTENDED WARNING: Proton 10MeV Integral Flux above 10pfu
expected
Extension to Serial Number: 266
Valid From: 2005 Jul 27 2305 UTC
Now Valid Until: 2005 Jul 29 2359 UTC
Warning Condition: Persistence
Predicted NOAA Scale: S1 - Minor
Comment: Predicted NOAA Scale: S1 Minor

- (2) Space Weather Message Code: ALTPX1
Serial Number: 257
Issue Time: 2005 Jul 30 0104 UTC

CONTINUED ALERT: Proton Event 10MeV Integral Flux exceeded
10pfu

Continuation of Serial Number: 255
Begin Time: 2005 Jul 27 2300 UTC
NOAA Scale: S1 - Minor
Comment: The current flux is 29 pfu s. A maximum flux of 41 pfu s was reached at 1715 UTC on July 29th 2005

- (3) Space Weather Message Code: SUMPX1
Serial Number: 34
Issue Time: 2005 Aug 01 1815 UTC

SUMMARY: Proton Event 10MeV Integral Flux exceeded 10pfu
Begin Time: 2005 Jul 27 2300 UTC
Maximum Time: 2005 Jul 29 1715 UTC
End Time: 2005 Aug 01 1040 UTC
Maximum 10MeV Flux: 41 pfu
NOAA Scale: S1 – Minor

g. Report and Forecast of Solar and Geophysical Activity (RSGA)

Joint USAF/NOAA Report of Solar and Geophysical Activity SDF Number 213 Issued at 2200Z on 01 Aug 2005

IA. Analysis of Solar Active Regions and Activity from 31/2100Z to 01/2100Z: Solar activity was at moderate levels. Region 792 (N12E25) produced the largest flare during the period, a long duration M1/1f flare that occurred at 01/1351Z. This event generated an associated Tenflare (290 sfu), a Type IV radio sweep, and a CME that may have a weak geoeffective component. Region 792 underwent a decrease in sunspot number. However, sunspot area has remained the same. This region continues to exhibit beta-gamma-delta magnetic features. Region 794 (S11E60) produced the second largest flare during the period, a C5 x-ray event that occurred at 01/1221Z. This region has shown growth in sunspot area over the interval. No new regions were numbered today.

IB. Solar Activity Forecast: Solar activity is expected to be at moderate levels. Region 792 is capable of producing M-class flares.

IIA. Geophysical Activity Summary 31/2100Z to 01/2100Z: The geomagnetic field was at quiet to active levels. The elevated activity may be attributed to a weak transient that was observed at the ACE spacecraft at approximately 01/0500Z. The greater than 10 MeV proton event that began at 27/2300Z ended at 01/1040Z, a maximum of 41 pfu occurred at 29/1715Z.

IIB. Geophysical Activity Forecast: The geomagnetic field is expected to be at predominantly quiet to unsettled levels. Isolated active conditions are possible on 04 August due to a glancing blow from the CME that was associated with the M1/1f flare that occurred today.

III. Event Probabilities 02 Aug-04 Aug
Class M 70/70/70

Class X 15/15/15
Proton 20/20/20
PCAF yellow

IV. Penticton 10.7 cm Flux

Observed 01 Aug 111
Predicted 02 Aug-04 Aug 110/105/105
90 Day Mean 01 Aug 096

V. Geomagnetic A Indices

Observed Afr/Ap 31 Jul 010/009
Estimated Afr/Ap 01 Aug 015/015
Predicted Afr/Ap 02 Aug-04 Aug 012/015-005/005-012/015

VI. Geomagnetic Activity Probabilities 02 Aug-04 Aug

A. Middle Latitudes

Active 30/15/30
Minor storm 10/05/10
Major-severe storm 05/01/05

B. High Latitudes

Active 35/20/35
Minor storm 15/05/15
Major-severe storm 05/01/05

h. Solar and Geophysical Activity Summary (SGAS)

:Product: Solar and Geophysical Activity Summary

:Issued: 2005 Aug 02 0248 UTC

Prepared jointly by the U.S. Dept. of Commerce, NOAA,

Space Environment Center and the U.S. Air Force.

#

Joint USAF/NOAA Solar and Geophysical Activity Summary

SGAS Number 214 Issued at 0245Z on 02 Aug 2005

This report is compiled from data received at SWO on 01 Aug

A. Energetic Events

Begin Max End Rgn Loc Xray Op 245MHz 10cm Sweep

B. Proton Events: The greater than 10 MeV proton event that began at 27/2300Z ended at 01/1040Z, a maximum of 41 pfu occurred at 29/1715Z.

C. Geomagnetic Activity Summary: The geomagnetic field was at quiet to active levels. The elevated activity may be attributed to a weak transient that was observed at the ACE spacecraft at approximately 01/0500Z.

D. Stratwarm: Not Available

E. Daily Indices: (real-time preliminary/estimated values)

10 cm 111 SSN 102 Afr/Ap 017/016 X-ray Background B2.0

Daily Proton Fluence (flux accumulation over 24 hrs)
GT 1 MeV 5.9e+07 GT 10 MeV 9.3e+05 p/(cm2-ster-day)
(GOES-11 satellite synchronous orbit W114 degrees)
Daily Electron Fluence
GT 2 MeV 1.60e+07 e/(cm2-ster-day)
(GOES-12 satellite synchronous orbit W76 degrees)
3 Hour K-indices:
Boulder 4 2 3 4 4 3 2 3 Planetary 4 1 3 4 3 3 3
F. Comments: None

i. Solar Region Summary (SRS)

:Product: Solar Region Summary
:Issued: 2005 Aug 02 0033 UTC
Prepared jointly by the U.S. Dept. of Commerce, NOAA,
Space Environment Center and the U.S. Air Force.

Joint USAF/NOAA Solar Region Summary
SRS Number 214 Issued at 0030Z on 02 Aug 2005
Report compiled from data received at SWO on 01 Aug
I. Regions with Sunspots. Locations Valid at 01/2400Z
Nmbr Location Lo Area Z LL NN Mag Type
0791 N12W75 157 0080 Hsx 02 02 Alpha
0792 N12E25 057 0420 Ekc 11 34 Beta-Gamma-Delta
0793 N13W29 111 0060 Cso 07 08 Beta
0794 S11E60 022 0110 Dao 06 07 Beta
0795 N15E64 018 0110 Hax 02 01 Alpha
IA. H-alpha Plages without Spots. Locations Valid at 01/2400Z Aug
Nmbr Location Lo
None
II. Regions Due to Return 02 Aug to 04 Aug
Nmbr Lat Lo
None

2. Space Weather Product Identification. The following are specific identification for SEC products, issued under the SEC's World Meteorological Organization identifier, KWNP. A complete list of SEC Space Weather Products transmitted on the National Weather Wire Service (NWS) Direct Broadcast Systems can be found at <http://www.sec.noaa.gov/wwire.html>. Note: WMO header identifiers appear on messages from NWS systems, but not on SEC messages.

NWSI 10-1101 OCTOBER 11, 2005

AWIPS ID	WMO ID	Title	Issue Frequency/Time
SWXCURIND	AXXX83	Current Space Weather Indices – Current Day	Hourly, beginning 0035 UTC
SWX3HRCON	FXXX04	3-hourly Space Weather Conditions and Forecast (WWV)	Every 3 hours, beginning 0000 UTC
SWXDAYSGA	AXXX01	Solar and Geophysical Activity Summary	Daily at 0245 UTC
SWXDAYSR	AXXX02	Solar Region Summary	Daily at 0030 UTC
SWXDAYIND	AXXX81	Daily Space Weather Indices	Every 6 hours beginning 0015 UTC
SWXDAYOBS	AXXX82	Summary of Space Weather Observations – Previous Day	Daily after 0030 UTC
SWXDAYEVT	AXXX80	Space Weather Event Reports – Previous Day	Daily after 0250 UTC
SWXDAYDSF	FXXX01	Report and Forecast of Solar and Geophysical Activity	Daily after 2200 UTC
SWXDAYPRE	FXXX04	3-Day Space Weather Predictions	Daily after 2200 UTC
SWXWEKHIL	FXXX06	7-Day Space Weather Highlights	Tuesdays, 2212 UTC
SWXWEKFOR	FXXX02	27-Day Space Weather Forecast	Tuesdays, 2212 UTC
SWXWEKOUT	FXXX05	27-Day Space Weather Outlook Table	Tuesdays, 2212 UTC
SWXADVOUT	NWXX04	Space Weather Advisory Outlook	Tuesdays, 1800 UTC
SWXADVBUL	NWXX05	Space Weather Advisory Bulletin	As needed

AWIPS ID	WMO ID	Title	Issue Frequency/Time
SWXADVMSG	NWXX06	Space Weather Advisory Messages – General messages from SEC	As needed
SWXxxxxxx (See first column below for xxxxxx)	See second column below (add KWNP)	Space Weather Alerts (See third column below)	As conditions warrant

X-ray Flux Alert and Event Summaries				
ALTXMF	WOXX01	ALERT: X-ray Flux exceeded M5	R2	
SUMXM5	WOXX01	SUMMARY: X-ray Event exceeded M5	R2	
SUMX01	WOXX02	SUMMARY: X-ray Event exceeded X1	R3	
SUMX10	WOXX02	SUMMARY: X-ray Event exceeded X10	R4	
SUMX20	WOXX02	SUMMARY: X-ray Event exceeded X20	R5	
Radio Burst Summaries				
ALTTP2	WOXX04	ALERT: Type II Radio Emission		
ALTTP4	WOXX04	ALERT: Type IV Radio Emission		
SUM10R	WOXX03	SUMMARY: 10cm Radio Burst		
Geomagnetic Warnings, Alerts, and Watches				
WARSUD	WOXX10	WARNING: Geomagnetic Sudden Impulse expected		
SUMSUD	WOXX10	SUMMARY: Geomagnetic Sudden Impulse		
WARK04	WOXX13	WARNING: Geomagnetic K-index of 4 expected	G1 G2 G3 or greater	Extended Warning Extended Warning Extended Warning Extended Warning
WARK05	WOXX11	WARNING: Geomagnetic K-index of 5 expected		
WARK06	WOXX12	WARNING: Geomagnetic K-index of 6 expected		
WARK07	WOXX14	WARNING: Geomagnetic K-index of 7 or greater expected		
ALTK04	WOXX13	ALERT: Geomagnetic K-index of 4	G1 G2 G3 G4 G5	
ALTK05	WOXX11	ALERT: Geomagnetic K-index of 5		
ALTK06	WOXX12	ALERT: Geomagnetic K-index of 6		
ALTK07	WOXX14	ALERT: Geomagnetic K-index of 7		
ALTK08	WOXX15	ALERT: Geomagnetic K-index of 8		
ALTK09	WOXX16	ALERT: Geomagnetic K-index of 9		
WATA20	WOXX20	WATCH: Geomagnetic A-index of 20 or greater predicted		
WATA30	WOXX21	WATCH: Geomagnetic A-index of 20 or greater predicted		

WATA50 WATA99	WOXX22 WOXX23	WATCH: Geomagnetic A-index of 30 or greater predicted WATCH: Geomagnetic A-index of 50 or greater predicted WATCH: Geomagnetic A-index of 100 or greater predicted		
Electron Flux Alert				
ALTEF3	WOXX30	ALERT: Electron 2MeV Integral Flux exceeded 1000pfu		
Proton Flux Warnings, Event Alerts, and Event Summaries				
WARPX1	WOXX32	WARNING: Proton 10MeV Integral Flux above 10pfu expected	S1 to S5	Extended Warning
ALTPX1	WOXX32	ALERT: Proton Event 10MeV Integral Flux exceeded 10pfu	S1	Continued Alert
ALTPX2	WOXX32	ALERT: Proton Event 10MeV Integral Flux exceeded 100pfu	S2	Continued Alert
ALTPX3	WOXX32	ALERT: Proton Event 10MeV Integral Flux exceeded 1000pfu	S3	Continued Alert
ALTPX4	WOXX32	ALERT: Proton Event 10MeV Integral Flux exceeded 10000pfu	S4	Continued Alert
ALTPX5	WOXX32	ALERT: Proton Event 10MeV Integral Flux exceeded 100000pfu	S5	Continued Alert
SUMPX1	WOXX32	SUMMARY: Proton Event 10MeV Integral Flux exceeded 10pfu	S1	
SUMPX2	WOXX32	SUMMARY: Proton Event 10MeV Integral Flux exceeded 100pfu	S2	
SUMPX3	WOXX32	SUMMARY: Proton Event 10MeV Integral Flux exceeded 1000pfu	S3	
SUMPX4	WOXX32	SUMMARY: Proton Event 10MeV Integral Flux exceeded 10000pfu	S4	
SUMPX5	WOXX32	SUMMARY: Proton Event 10MeV Integral Flux exceeded 100000pfu	S5	
WARPC0	WOXX31	WARNING: Proton 100MeV Integral Flux above 1pfu expected		Extended Warning
ALTPC0	WOXX31	ALERT: Proton Event 100MeV Integral Flux exceeded 1pfu		Continued Alert
SUMPC0	WOXX31	SUMMARY: Proton Event 100MeV Integral Flux exceeded 1pfu		